



Groundwater Program Status

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OREM has an extensive program in place to monitor and manage groundwater challenges



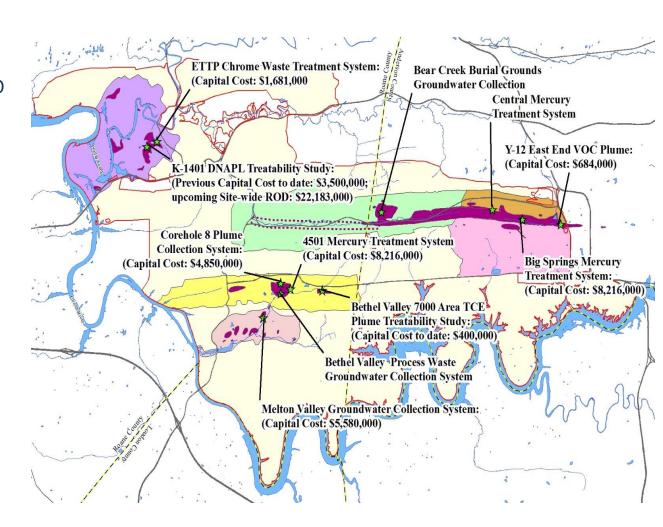
- Groundwater investigation and actions underway since the 1980's:
 - Burial grounds
 - o Industrial spills
- Total groundwater wells installed:
 - o Y-12: 547
 - o ORNL: 996 (Offsite 23)
 - ETTP: 518 (96 installed last year)
- 2018 annual monitoring:
 - o Groundwater well sampling: >800:
 - Groundwater elevation level readings: ~1,400
 - Surface water sampling: ~1,850
- Results documented yearly in Remediation Effectiveness Report
- Groundwater remediation and monitoring costs in 2019: \$13M



Multiple groundwater treatment systems have been designed and installed to manage groundwater plumes



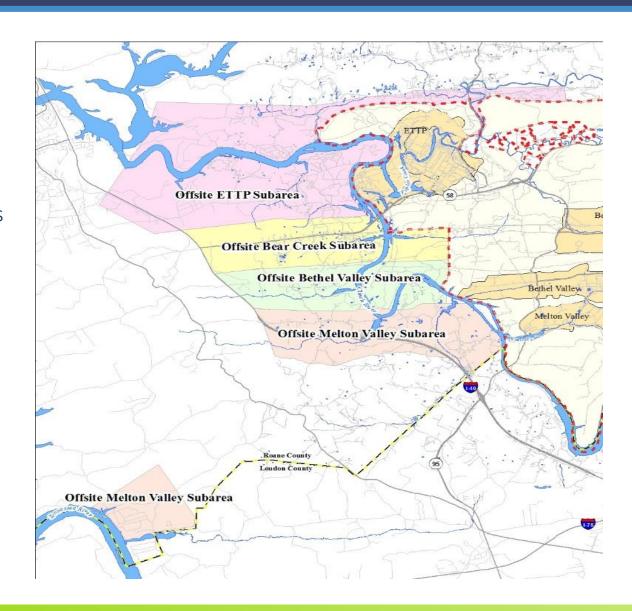
- Nine collection/ treatment systems to address most major sources
- Construction costs to date: \$33M
- Surveillance and maintenance of systems: >\$3.5M annually



First priority is to protect human health and environment



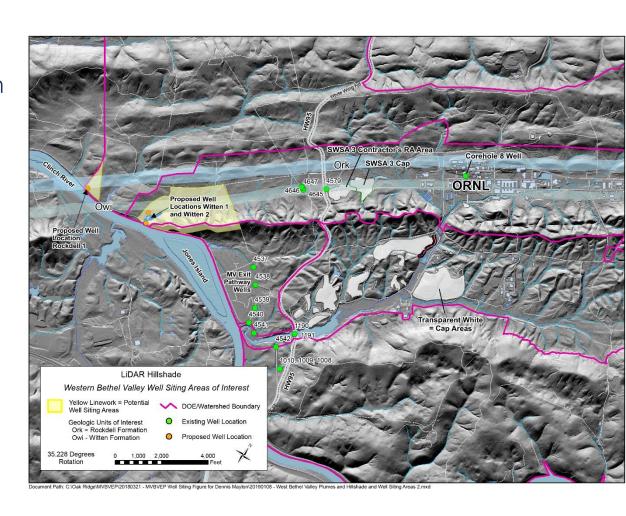
- Offsite Remedial Site
 Evaluation Report
 approved by regulators
 December 2018
- "From the groundwater data collected during this investigation there is <u>no</u> indication that there was an unacceptable health risk related to possible DOE groundwater contamination", EPA
- DOE will sample 14 residential well locations annually over next three years (2019-2021)



DOE continues to protect offsite public health



- Melton Valley/Bethel
 Valley Exit Pathway
 Remedial Investigation
 Work Plan Submitted
- Planning meetings held between DOE, EPA, and TDEC:
 - No new wells needed for Melton Valley
 - Supplemental wells being planned for Bethel Valley
- DOE still paying to supply public water to 40 private residences



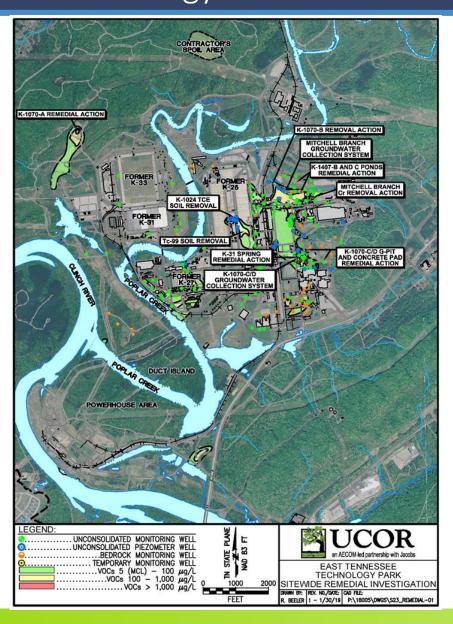
Groundwater is localized to Main Plant area





DOE has taken action on numerous sources at the East Tennessee Technology Park

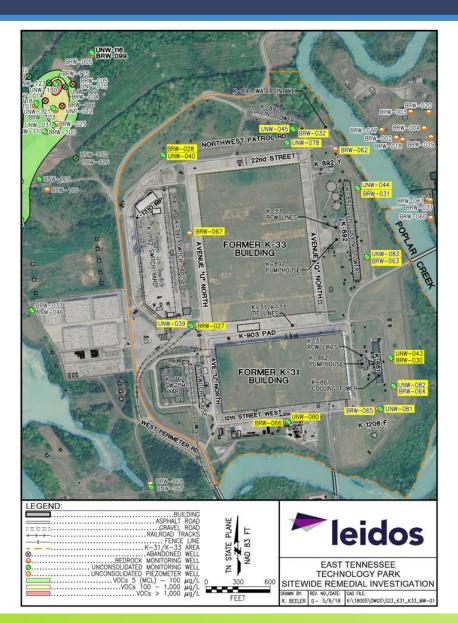




Groundwater at K-31/K-33 recommended for No Further Action



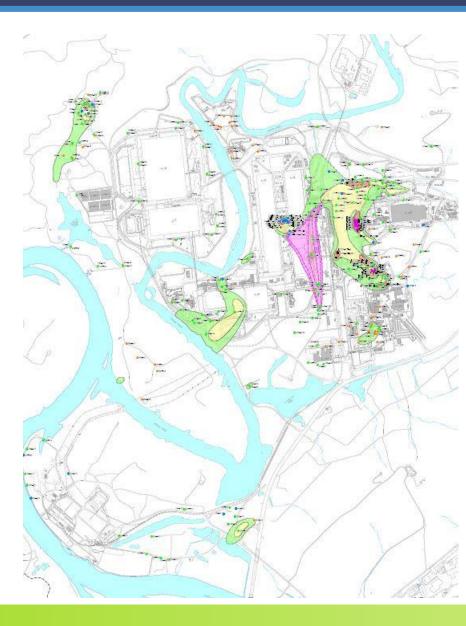
- Monitoring ongoing for nearly 30 years since 1989
- DOE pursuing No Further Action for K-31/K-33 site
- 21 permanent monitoring wells in place
 - o 1,781 samples collected



DOE has committed significant resources to groundwater at the East Tennessee Technology Park



- Groundwater remedial investigation conducted 1997-1998
- 328 existing permanent monitoring wells in Main Plant Feasibility Site Area (419 wells for entire ETTP site)
- Groundwater Treatability Study completed at K-1401 in 2017 to evaluate in-situ thermal treatment:
 - Treatability Study cost to date: \$8.5 M
 - Conclusion in-situ thermal won't work in deep bedrock but will in shallow zone
 - 96 new monitoring wells installed in 2017 and sampled in 2017/2018
 - Currently installing an additional
 29 wells in Main Plant area at
 EPA/TDEC request



Full restoration of groundwater in the Main Plant area is likely to be Technically Impractical

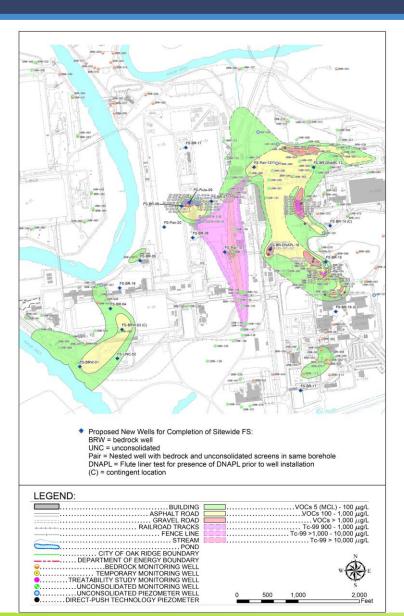




We are working with TDEC and EPA to establish final Record of Decision for Main Plant groundwater



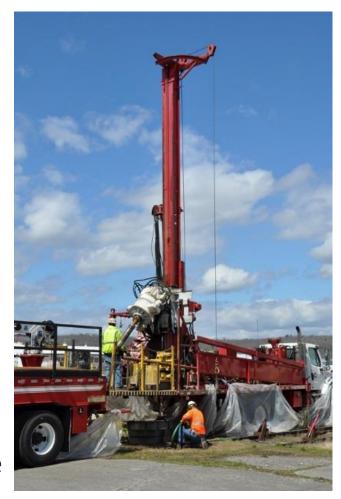
- Full range of groundwater cleanup approaches under evaluation with DOE, EPA, and TDEC
 - Aggressive source control
 - Plume confinement at Main Plant boundary
 - Monitored Natural Attenuation
 - Technical Impracticability Waiver
- Feasibility Study Milestone:
 September 30, 2019
- Proposed Plan: February 13, 2021
- Record of Decision: January 8, 2022



OREM continues to place emphasis on groundwater control and restoration



- OREM has a vast monitoring network that provides an immense amount of data
- We spend nearly \$15 million annually on groundwater remediation and monitoring
- Crews have installed all of the wells requested by EPA/TDEC, and we've developed models
- Current technologies cannot cost-effectively address certain source areas at ETTP
- We have collected enough information to work with regulators on developing final decisions
- Decisions needed to finalize GW management approach, and allow site reuse





Questions?